Medical Uses of 902 to 928 MHz Band

The 902-928 MHz band, part of the ISM (Industrial, Scientific, and Medical) spectrum, has several critical applications in the medical field, particularly in wireless medical devices, monitoring systems, and telemetry. Here are more detailed examples:

Medical Telemetry Systems

Overview: Medical telemetry systems use the 902-928 MHz band to wirelessly transmit patient data such as heart rate, ECG readings, and other vital signs from patients to monitoring stations. This enables continuous patient monitoring without being tethered by cables, allowing for greater mobility and flexibility in care.

Example: The **GE Healthcare ApexPro CH telemetry system** leverages this band to provide real-time patient monitoring across large hospital campuses. By using this spectrum, ApexPro can monitor patients who are ambulatory, ensuring continuous data flow even when patients move between rooms or departments.

Additional Details: ApexPro CH uses this band to avoid interference with other wireless systems in the hospital, ensuring that critical patient data is transmitted securely and reliably across various hospital zones.

Wireless Patient Monitoring Systems

Overview: Wireless patient monitoring systems in hospitals and clinics frequently use the 902-928 MHz frequency to transmit health data. These systems allow continuous, wireless monitoring of patients, facilitating improved care for patients who require constant observation.

Example: **Philips IntelliVue telemetry systems** use this band to support wireless monitoring across multiple care settings, including ICUs and general wards. IntelliVue telemetry provides comprehensive patient data to centralized stations, enabling caregivers to monitor vital signs such as heart rate and oxygen saturation levels from a distance.

Additional Details: Philips IntelliVue systems are designed to operate seamlessly within the hospital's wireless infrastructure, avoiding interference with other critical wireless communications.

Implantable Medical Devices

Overview: Implantable medical devices that use the 902-928 MHz band include insulin pumps, pacemakers, and continuous glucose monitors (CGMs). These devices communicate wirelessly with external receivers or mobile applications to transmit vital health data to patients or healthcare providers.

Example: **Medtronic's MiniMed continuous glucose monitoring system** uses the 902-928 MHz band to transmit glucose data from a sensor implanted under the skin to an insulin pump or mobile device. This allows diabetic patients to manage their blood sugar levels more effectively by receiving real-time data.

Additional Details: The MiniMed system continuously transmits glucose data every five minutes, helping patients to make timely adjustments to their insulin dosages and avoid potential health complications.

Home Healthcare Monitoring Systems

Overview: Home healthcare monitoring systems that use the 902-928 MHz band enable remote monitoring of patients from their homes. These systems can monitor vital signs, medication adherence, and even alert caregivers if a patient's condition changes.

Example: **Honeywell's Genesis DM remote monitoring system** uses the 902-928 MHz frequency to transmit data from home-based monitoring devices to healthcare providers, allowing for the remote monitoring of chronic conditions like COPD, diabetes, and heart disease.

Additional Details: Genesis DM provides a secure and reliable communication link that ensures patients can remain at home while still receiving continuous medical oversight.

Wearable Medical Devices

Overview: Wearable medical devices, such as fitness trackers, ECG monitors, and other health monitoring devices, use the 902-928 MHz band for wireless data transmission. These devices are critical for continuous health monitoring, particularly for patients who require long-term observation.

Example: **BioTelemetry's wearable ECG monitors**, which use this frequency, allow patients with heart conditions to monitor their ECG data continuously. The data is transmitted to a centralized system where healthcare professionals can monitor heart rhythms and detect potential problems.

Additional Details: BioTelemetry's devices provide real-time transmission of ECG data, enabling early detection of arrhythmias and other cardiac events, which can be lifesaving for patients with heart disease.

Technical Advantages of the 902-928 MHz Band in Healthcare:

Longer Range and Penetration: This frequency range provides better coverage and penetration through walls and obstacles compared to higher-frequency bands, making it ideal for use in large hospital environments and home care settings.

Lower Interference: The 902-928 MHz band is less congested than some other wireless frequencies, reducing the chance of interference with other devices, which is crucial for transmitting medical data reliably.

Power Efficiency: Devices using the 902-928 MHz band tend to consume less power, which is critical for implantable and wearable medical devices that need to operate for long periods on a single battery charge.

These applications highlight the vital role of the 902-928 MHz band in advancing medical technology, improving patient care, and enabling new healthcare innovations.

Here are specific examples of companies in the medical field that utilize the 902-928 MHz band for their medical devices and solutions:

GE Healthcare

- **Use**: GE Healthcare's **ApexPro CH telemetry system** uses the 902-928 MHz band to monitor patients' vital signs in real time across large hospital facilities. This wireless telemetry system helps hospitals manage patients' heart rate and ECG data without the constraints of wired connections.
- **Product Example**: **ApexPro CH Telemetry System**
- **Application**: Hospital patient monitoring.

Philips Healthcare

- **Use**: Philips **IntelliVue patient monitoring systems** operate in the 902-928 MHz band to provide real-time data from wireless patient monitors, allowing for the continuous monitoring of vital signs such as heart rate, oxygen saturation, and blood pressure across different care settings.
- **Product Example**: **IntelliVue MX40 Wearable Patient Monitor**
- **Application**: Wireless patient monitoring in hospitals.

Medtronic

- **Use**: Medtronic's **MiniMed continuous glucose monitoring (CGM) systems** use the 902-928 MHz band for wireless communication between implanted glucose sensors and external insulin pumps or monitoring devices. This allows for continuous tracking of glucose levels in diabetic patients.
- **Product Example**: **MiniMed 670G Insulin Pump System**
- **Application**: Diabetes management through continuous glucose monitoring.

Honeywell Life Care Solutions

- **Use**: Honeywell's **Genesis DM home healthcare monitoring system** uses the 902-928 MHz band to transmit health data from home-based monitoring devices to healthcare providers. It allows remote monitoring of patients with chronic conditions such as COPD, heart disease, and diabetes.
- **Product Example**: **Genesis DM Remote Monitoring System**
- **Application**: Remote patient monitoring for home healthcare.

BioTelemetry (now part of Philips)

- **Use**: BioTelemetry's wearable ECG monitors operate in the 902-928 MHz band to transmit real-time cardiac data to healthcare providers. This allows for continuous monitoring of patients with heart conditions, helping to detect arrhythmias and other cardiac events early.
- **Product Example**: **BioTel Heart Wearable ECG Monitor**
- **Application**: Continuous cardiac monitoring and early detection of heart conditions.

These companies utilize the 902-928 MHz spectrum to support a variety of critical medical applications, ranging from in-hospital patient monitoring to home healthcare and remote patient management. Their solutions help improve patient outcomes by providing continuous, real-time data to healthcare providers.